

# PATENT SPECIFICATION

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DRAWINGS ATTACHED

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## COMPLETE SPECIFICATION

### Improvements in Sand Valve for Sand-Blast Apparatus

We, ATLAS COPCO AKTIEBOLAG, a company registered under the laws of Sweden, of Nacka, Sweden, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a sand valve for sand-blast apparatus and more particularly to a sand valve for controlling the discharge channel from a pressurized sand hopper. Such valves are subject to very heavy wear because of the abrasive action of the sand flow passing therethrough. When the valve body is worn down and has to be exchanged, much time is lost during detaching and attaching of the valve body and the emptying and replenishment of the sand hopper caused thereby.

It is the main object of the invention to create a sand valve with increased operable life and adapted for making possible rapid exchange of the valve body without emptying of the sand hopper and without relieving the pressure therein. For these and other purposes there is according to the invention provided a sand valve for sand-blast apparatus particularly for controlling the discharge channel from a pressurized sand hopper, said sand valve comprising a valve housing connectable to said hopper, a discharge channel in said valve housing in communication with said hopper, a cross bore in said housing intersecting said discharge channel, a valve body movably mounted in said cross bore for cooperating with the discharge channel whereby to control the discharge of sand through said discharge channel, and a plug means adjacent to said valve body in the cross bore for axial slidable displacement therein together with said valve body between a working position with said valve body in alignment with the discharge channel and said plug means off-set thereto in said cross bore and a valve exchanging position with said plug means in sealing alignment with

the discharge channel and said valve body offset thereto and uncovered by said cross bore for the removal thereof from the said valve housing. Thanks to this embodiment the sand hopper is sealed off automatically during exchange or inspection of the valve.

The invention will be described more in detail by the aid of the enclosed drawing which in Fig. 1 shows a longitudinal section of the sand valve. Fig. 2 is a longitudinal section on the line 2—2 in Fig. 1. Fig. 3 shows the elements in Fig. 2 during exchange of the valve body. Fig. 4 is a cross section on the line 4—4 in Fig. 1. Fig. 5 finally shows the valve body in Fig. 1 on a larger scale with one of the shanks thereof in engagement with grooves on a cooperating turning spindle.

In Fig. 1 on the lower end of a pressurized sand hopper 10 there is screwed on a valve housing 11. The valve housing 11 has at the lower end thereof a mixing channel 12 which is supplied with compressed air at one end thereof from a suitable source via a hose 13. From the mixing channel 12 a suitable mixture of sand and air is discharged via a sand-blast hose 14 to a sand-blast nozzle, not shown. The sand is supplied to the mixing channel 12 from above from the sand hopper 10 via a discharge channel 15. As shown in Fig. 4, the cross section of the discharge channel 15 has a tip 16 facing the inlet direction of the compressed air into the mixing channel 12.

The outlet channel 15 is intersected by a cross bore 18 with a diameter larger than the maximum width of the discharge channel 15. Preferably the bore 18 is somewhat displaced laterally with respect to the discharge channel 15 so that the partly cylindrical portion 19, Fig. 1, of the bore 18 falling outside of the extension of the discharge channel 15, becomes substantially larger than the corresponding portion at the other side of the discharge channel 15. In order to provide better room for a sufficient lateral displacement of the cross

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[Price 4s. 6d.]

bore 18 within the valve housing 11, the discharge channel 15 is arranged somewhat inclined with respect to the axis of the mixing channel 12.

5 One end of the cross bore 18 is closed by a closure-shaped end wall 21 which is slidably inserted into the cross bore 18 and sealed thereagainst by a suitable sealing means such as a sealing ring. The end wall 21 rests against the valve housing 11 by an annular shoulder 22. The other end of the cross bore 18 receives slidably and sealingly therein a cylindrical end wall 23 or plug means in the shape of a plug of rubber preferably with one or more rings for additional sealing therearound. The end walls 21, 23 are passed sealingly by a turning spindle 24 which is provided with spaced lock rings 25 between which the end walls 21, 23 are fixed axially with respect to one another.

10 The turning spindle 24 may be turned by means of a handle 26.

15 Between the end walls 21, 23 there is inserted into the bore 18 a valve body 27 consisting of a partly cylindrical rubber body 29, Fig. 5, vulcanized fast around the base of a U-shaped reinforcing plate 28 and with segment-shaped cross section with the radius of the segment's arc equal to the radius of the cross bore. The shanks 30 of the reinforcing plate 28 are provided with longitudinal open notches 31 in

20 slideable but non-rotatable engagement with cooperating grooves 32 on the turning spindle 24 which is straddled by the shanks 30. By turning of the spindle 24 one thus can turn the valve body 27 which slides along the wall of the cross bore 18 and depending on the adjustment cuts off a larger or smaller portion of the discharge channel 15 downstream thereof. In connection therewith the valve body 27

25 projects to a greater or lesser degree into the wide portion 19 of the cross bore 18 outside of the discharge channel 15 such as to take a position entirely outside of the sand flow passing the discharge channel 15 in the fully open position of the valve body 27, designated by broken lines and the numeral 34 in Fig. 1. The valve body 27 is retained in the adjusted position by friction, sand pressure and by suitable locking means, not illustrated, for the handle 26.

30 If due to wear the valve is to be turned over on the spindle 24 or exchanged, one releases the handle 26 from the locking means if such locking means are present and moves the turning spindle 24 deeper into the cross bore 18 from the position shown in Fig. 2 to the position depicted in Fig. 3, wherein the valve body 29 is uncovered by the cross bore 18 and may be taken away radially from the spindle 24 and turned over or exchanged. In

35 this valve changing position the end wall 23 takes a position in alignment with the discharge channel and closes the latter sealingly whereby the sand left in the hopper 18 remains undisturbed therein under air pressure. Upon

pushing of a new valve body 27 in place with the shank notches 31 thereof straddling the grooves 32, the turning spindle 24 is returned to the position depicted in Fig. 2 and the sand valve is thus again ready for use.

70 In cooperation with the valve body 27, the tipped portion 16 of the discharge channel makes possible a substantially increased exactness in setting of the sand concentration per cubic metre of air and thanks to this the sand-blasting work may be performed with better economy.

75 **WHAT WE CLAIM IS:—**

1. Sand valve for sand-blast apparatus for controlling the discharge channel from a pressurized sand hopper, said sand valve comprising a valve housing connectable to said hopper, a discharge channel in said valve housing in communication with said hopper, a cross bore in said housing intersecting said discharge channel, a valve body movably mounted in said cross bore for cooperating with the discharge channel whereby to control the discharge of sand through said discharge channel said valve body being removable for valve exchanging purposes from said valve housing, and a plug means adjacent to said valve body in the cross bore for axial slideable displacement therein together with said valve body between a working position with said valve body in alignment with the discharge channel and said plug means off-set thereto in said cross bore and a valve exchanging position with said plug means in sealing alignment with the discharge channel and said valve body off-set thereto and uncovered by said cross bore for the removal thereof from said valve housing.

80 2. Sand valve according to claim 1 in which said valve body is partly cylindrical in shape with a substantially segment shaped cross section, shanks at the ends of said valve body, a turning spindle for said valve body projecting into said cross bore, and cooperating means on said shanks and said spindle for coupling said valve non-rotatably but radially movably and releasably to said spindle, the valve body being rotatable in the cross bore by means of the turning spindle.

85 3. Sand valve according to claim 1 in which said cross bore is closed sealingly by end walls at opposite sides of said valve body, one of said end walls forming said plug means.

90 4. Sand valve according to claim 2 in which said cross bore receives sealingly therein a pair of end walls at opposite sides of said valve body and mounted on said turning spindle, lock means on said spindle for fixing said end walls axially thereon, and one of said end walls forming said plug means.

95 5. Sand valve according to claim 2 in which said valve body is a rubber body, a U-shaped reinforcing plate carrying said rubber body around the base thereof, transverse grooves on said spindle, and the shanks of said plate hav-

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ing longitudinal notches thereon straddling said turning spindle and engaging said grooves, said notches and grooves forming said cooperating means for coupling said shanks non-rotatably but radially movably and releasably to said spindle.

5 6. Sand valve according to claim 2 in which said cross bore is laterally offset with respect to said discharge channel for providing a valve position for said valve body in the off-set portion of said cross bore outside of the sand flow

passing said discharge channel.

7. Sand valve substantially as hereinbefore described with reference to the accompanying drawings.

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1 SHEET      *This drawing is a reproduction of  
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